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SMART RECEIPT

BACKGROUND OF THE INVENTION

5   **1.   Technical Field:**

The present invention relates generally to computer network environments, and more specifically to the maintenance of receipt information regarding commercial transactions.

10

2.   Description of Related Art:

Many merchants now employ Electronic Bill Presentment and Payment (EBPP) which send invoices to customers over the Internet. Customers may then pay

15   bills electronically via Web payment services in which they are enrolled. EBPP thus provides the customer with a personal account of bills payable. EBPP services may also provide links to information and support services that are not available with paper invoices. However, no

20   equivalent service is provided for customer receipts.

Current business processes for Point of Sale (POS) generate a "hard-copy receipt" or "electronic receipt" for the customer for every purchase. This POS process also keeps receipts for the customers, merchants, and

25   credit card companies (assuming the purchase was made with a credit card). Thus, the same receipt information is kept in multiple locations. However, this information is static and cannot be enhanced if additional information is necessary. In addition, customers have no

30   control over the disposition of the receipt or the

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dissemination of the receipt information to third parties
Current approaches also do not provide personal receipt
accounts which customers may access.

    Therefore, it would be desirable to have an
5 electronic receipt service that enables customers to
retrieve their electronic receipts and control the
disposition of those receipts.

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SUMMARY OF THE INVENTION

The present invention provides a method, program, and system for processing electronic receipts within a
5   computer network. The present invention comprises creating a customer profile for a user using a Smart Receipt application. When the user purchases items, electronic receipts (smart receipts) are sent from the point of sale to a designated database. The database may
10   be on a credit card company server, the product manufacturer's server, a special cash receipts server, or a central clearing house server. When the customer wants a copy of a receipt, he or she enters search parameters which specify the desired receipt. The search parameters
15   may include item type, date of purchase, and method of purchase. A Smart Receipt object is then initiated, which retrieves the specified smart receipt from the appropriate database, according to the search parameters. A copy of the retrieved smart receipt is then downloaded
20   to a client machine (e.g. PDA, PC) designated by the customer profile.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The
5 invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

10 **Figure 1** depicts a pictorial representation of a network of data processing systems in which the present invention may be implemented;

Figure 2 depicts a block diagram of a data processing system that may be implemented as a server in accordance
15 with a preferred embodiment of the present invention;

Figure 3 depicts a block diagram illustrating a data processing system **client** in which the present invention may be implemented;

Figure 4A depicts a diagram of a client in the form
20 of a personal digital assistant (PDA) in accordance with a preferred embodiment of the present invention;

Figure 4B depicts a block diagram illustrating the hardware configuration of a PDA in accordance with a preferred embodiment of the present invention;

25 **Figure 5** depicts a schematic diagram illustrating the architecture of the Smart Receipt service in accordance with the present invention;

Figure 6 depicts a schematic diagram illustrating a Smart Receipt clearing house service in accordance with
30 the present invention; and

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Figure 7 depicts a flowchart illustrating the process of configuring a user profile for the Smart Receipt service in accordance with the present invention;

Figure 8 depicts a flowchart illustrating the Smart Receipt purchasing process in accordance with the present invention; and

Figure 9 depicts a flowchart illustrating the Smart Receipt search process in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention provides a process for
5   handling electronic receipts in order to avoid
duplication of information, and also provides services
for the customer in need of additional information about
a purchased item.

With reference now to the figures, **Figure 1** depicts a
10   pictorial representation of a network of data processing
systems in which the present invention may be implemented.
Network data processing system **100** is a network of
computers in which the present invention may be
implemented. Network data processing system **100** contains
15   a network **102,** which is the medium used to provide
communications links between various devices and computers
connected together within network data processing system
100. Network **102** may include connections, such as wire,
wireless communication links, or fiber optic cables.

20   In the depicted example, a server **104** is connected to
network **102** along with storage unit **106.** In addition,
clients **108, 110,** and **112** also are connected to network
102. These clients **108, 110,** and **112** may be, for example,
personal computers or network computers. In the depicted
25   example, server **104** provides data, such as boot files,
operating system images, and applications to clients
108-112. Clients **108, 110,** and **112** are clients to server
104. Network data processing system **100** also includes PDA
120 and may include additional servers, clients, and other
30   devices not shown.

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In the depicted example, network data processing system **100** is the Internet with network **102** representing a worldwide collection of networks and gateways that use the

5 TCP/IP suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host computers, consisting of thousands of commercial, government, educational and other computer systems that

10 route data and messages. Of course, network data processing system **100** also may be implemented as a number of different types of networks, such as for example, an intranet, a local area network (LAN), or a wide area network (WAN). **Figure 1** is intended as an example, and not

15 as an architectural limitation for the present invention.

Referring to **Figure 2,** a block diagram of a data processing system that may be implemented as a server, such as server **104** in **Figure 1,** is depicted in accordance with a preferred embodiment of the present invention.

20 Data processing system **200** may be a symmetric multiprocessor (SMP) system including a plurality of processors **202** and **204** connected to system bus **206.** Alternatively, a single processor system may be employed. Also connected to system bus **206** is memory

25 controller/cache **208,** which provides an interface to local memory **209.** I/O bus bridge **210** is connected to system bus **206** and provides an interface to I/O bus **212.** Memory controller/cache **208** and I/O bus bridge **210** may be integrated as depicted.

30 Peripheral component interconnect (PCI) bus bridge **214** connected to I/O bus **212** provides an interface to PCI

local bus **216**. A number of modems may be connected to PCI
bus **216**. Typical PCI bus implementations will support
four PCI expansion slots or add-in connectors.
Communications links to network computers **108-112** in

5   **Figure 1** may be provided through modem **218** and network
adapter **220** connected to PCI local bus **216** through add-in
boards.

Additional PCI bus bridges **222** and **224** provide
interfaces for additional PCI buses **226** and **228**, from

10   which additional modems or network adapters may be
supported. In this manner, data processing system **200**
allows connections to multiple network computers. A
memory-mapped graphics adapter **230** and hard disk **232** may
also be connected to I/O bus **212** as depicted, either

15   directly or indirectly.

Those of ordinary skill in the art will appreciate
that the hardware depicted in **Figure 2** may vary. For
example, other peripheral devices, such as optical disk
drives and the like, also may be used in addition to or in

20   place of the hardware depicted. The depicted example is
not meant to imply architectural limitations with respect
to the present invention. Standard components such as a
keyboard, mouse and display are not shown in this figure.

The data processing system depicted in **Figure 2** may

25   be, for example, an eServer pSeries system, a product of
International Business Machines Corporation in Armonk, New
York, running the Advanced Interactive Executive (AIX) or
Linux operating systems.

With reference now to **Figure 3,** a block diagram

30   illustrating a data processing system is depicted in which
the present invention may be implemented. Data processing

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system **300** is an example of a client computer. Data
processing system **300** employs a peripheral component
interconnect (PCI) local bus architecture. Although the
depicted example employs a PCI bus, other bus

5   architectures such as Accelerated Graphics Port (AGP) and
Industry Standard Architecture (ISA) may be used.
Processor **302** and main memory **304** are connected to PCI
local bus **306** through PCI bridge **308**. PCI bridge **308** also
may include an integrated memory controller and cache

10   memory for processor **302**. Additional connections to PCI
local bus **306** may be made through direct component
interconnection or through add-in boards. In the depicted
example, SCSI host bus adapter **312,** and expansion bus
interface **314** are connected to PCI local bus **306** by direct

15   component connection. In contrast, local area network
(LAN) adapter **310,** audio adapter **316,** graphics adapter
318, and audio/video adapter **319** are connected to PCI
local bus **306** by add-in boards inserted into expansion
slots. Expansion bus interface **314** provides a connection

20   for a keyboard and mouse adapter **320,** modem **322,** and
additional memory **324.** Small computer system interface
(SCSI) host bus adapter **312** provides a connection for hard
disk drive **326,** tape drive **328,** CD-ROM drive **330,** and DVD
drive **332.** Typical PCI local bus implementations will

25   support three or four PCI expansion slots or add-in
connectors.

An operating system runs on processor **302** and is used
to coordinate and provide control of various components
within data processing system **300** in **Figure 3.** The

30   operating system may be a commercially available operating
system, such as Windows 2000, which is available from

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Microsoft Corporation. An object oriented programming
system such as Java may run in conjunction with the
operating system and provide calls to the operating system
from Java programs or applications executing on data
5   processing system **300**. "Java" is a trademark of Sun
Microsystems, Inc. Instructions for the operating system,
the object-oriented programming system, and applications
or programs are located on storage devices, such as hard
disk drive **326,** and may be loaded into main memory **304** for
10   execution by processor **302.**

Those of ordinary skill in the art will appreciate
that the hardware in **Figure 3** may vary depending on the
implementation. Other internal hardware or peripheral
devices, such as flash ROM (or equivalent nonvolatile
15   memory) or optical disk drives and the like, may be used
in addition to or in place of the hardware depicted in
Figure 3. Also, the processes of the present invention
may be applied to a multiprocessor data processing
system.

20   As another example, data processing system **300** may
be a stand-alone system configured to be bootable without
relying on some type of network communication interface,
whether or not data processing system **300** comprises some
type of network communication interface. As a further
25   example, data processing system **300** may be a Personal
Digital Assistant (PDA) device, which is configured with
ROM and/or flash ROM in order to provide non-volatile
memory for storing operating system files and/or
user-generated data.

30   The depicted example in **Figure 3** and above-described
examples are not meant to imply architectural
limitations. For example, data processing system **300**

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also may be a notebook computer or hand held computer in addition to taking the form of a PDA. Data processing system **300** also may be a kiosk or a Web appliance.

With reference now to **Figure 4A,** a diagram of a
5 client in the form of a personal digital assistant (PDA) is depicted in accordance with a preferred embodiment of the present invention. PDA **400** includes a display **402** for presenting textual and graphical information. Display **402** may be a known display device, such as a
10 liquid crystal display (LCD) device. The display may be used to present a map or directions, calendar information, a telephone directory, or an electronic mail message. In these examples, screen **402** may receive user input using an input device such as, for example, stylus
15 **410.**

PDA **400** may also include keypad **404,** speaker **406,** and antenna **408.** Keypad **404** may be used to receive user input in addition to using screen **402.** Speaker **406** provides a mechanism for audio output, such as
20 presentation of an audio file. Antenna **408** provides a mechanism used in establishing a wireless communications link between PDA **400** and a network, such as network **400** in **Figure 1.**

PDA **400** also preferably includes a graphical user
25 interface that may be implemented by means of systems software residing in computer readable media in operation within PDA **400.**

Turning now to **Figure 4B,** a block diagram illustrating the hardware configuration of PDA **400** is
30 shown in accordance with a preferred embodiment of the present invention. PDA **400** is an example of a PDA in

which code or instructions implementing the processes of
the present invention may be located. PDA **400** includes a
bus **422** to which processor **424** and main memory **426** are
connected. Display adapter **428**, keypad adapter **430**,

5   storage **432**, and audio adapter **434** also are connected to
bus **422**. Modem **436** provides a mechanism for PDA **400** to
communicate with a computer network, such as Network **100**.
Cradle link **438** provides a mechanism to connect PDA **400**
to a cradle used in synchronizing data in PDA **400** with

10   another data processing system. Further, display adapter
428 also includes a mechanism to receive user input from
a stylus when a touch screen display is employed.

An operating system runs on processor **424** and is
used to coordinate and provide control of various

15   components within PDA **400** in **Figure 4B**. The operating
system may be, for example, a commercially available
operating system such as Palm OS, which is available from
Palm Corporation. Instructions for the operating system
and applications or programs are located on storage

20   devices, such as storage **432**, and may be loaded into main
memory **426** for execution by processor **424**.

Those of ordinary skill in the art will appreciate
that the hardware in **Figure 4B** may vary depending on the
implementation. Other internal hardware or peripheral

25   devices, such as flash ROM (or equivalent nonvolatile
memory) or optical disk drives and the like, may be used
in addition to or in place of the hardware depicted in
Figure 4B.

Referring to **Figure 5,** a schematic diagram

30   illustrating the architecture of the Smart Receipt
service is depicted in accordance with the present

invention. The present invention creates a "Smart Receipt" object **505** resident on the customer's personal computer or PDA. This Smart Receipt object manages access to all of the user's receipts, and eliminates the

5 need to create a "customer copy" of receipts. When a customer makes a purchase, smart receipts (along with user identification data) are sent from the Point of Sale (POS) **501** to various destinations, depending on the method of payment. For example, smart receipts for

10 credit card purchases might be sent to the credit card company server **502** and/or manufacturer server **503**. Smart receipts for cash or check purchases can be sent to a cash receipt server **504** or the manufacturer server **503**. The cash receipt server may be maintained by a merchant

15 or bank, or used as a safe deposit for the customer.

Maintaining the receipts on the manufacturer and cash receipts servers **503** and **504,** facilitates customer service. By using the smart receipts, manufacturers and merchants can maintain and update customer databases much

20 more efficiently than relying on warranty cards or proof of purchase certificates mailed in by customers after a purchase. The database of smart receipts, combined with customer identification data stored with the receipts, allows merchants and manufacturers to offer additional

25 services, such as extended warranties, product upgrades, product recalls, as well as other services related to product safety and quality control. Thus, the Smart Receipt service might make a merchant, credit card company, or manufacturer more attractive to customers.

30 By using the Smart Receipt service, a customer can make purchases without having to worry about keeping or storing receipts. At the time of purchase, the user

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would have the option of providing a number/code for categorizing the purchase. For example, the purchase might be for personal, business or educational purposes. When the customer needs the receipt at a later date, the

5   customer uses the Smart Receipt object **505** to obtain the receipt from the appropriate location. For example, if the customer is experiencing problems with a refrigerator that was purchased six months earlier, the customer would use the Smart Receipt object **505** to obtain the smart

10   receipt by entering search criteria such as: item type, brand name, approximate date of purchase, method of purchase (i.e. cash or credit), and a price range. The Smart Receipt object **505** uses this search criteria and the customer's identity, to access the customer's credit

15   card and cash purchase records, which are stored at the appropriate location. After the Smart Receipt object **505** obtains the desired smart receipt, it can make additional requests on behalf of the customer. Continuing the above example, the Smart Receipt object **505** might contact the

20   refrigerator manufacturer to obtain information about the warranty on the refrigerator. This may be accomplished by contacting a manufacturer web site or server. As another example, the Smart Receipt can also be configured to obtain receipts which may be used for tax deduction

25   purposes.

The smart receipts are encrypted and cannot be modified by the customer/user, thus ensuring their authenticity for such purposes as proof of purchase and tax deductions. However, it should be emphasized that

30   the receipts are owned by the customer, not the merchants, manufacturers, or credit card companies. Therefore, the customer controls where the receipts are

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stored and when they can be accessed. With conventional receipts, merchants or credit card companies may give the receipt information to third parties which may use the information for mailing lists or other marketing uses.

5 Though customers can request that their receipt information not be sent to third parties, this is an extra step that customers must take, and often do not. By contrast, with the present invention, the customer owns the smart receipts and controls how and if the

10 receipt information is disseminated. Therefore, the present invention provides security and privacy that conventional sales receipts do not. Moreover, the customer can set the Smart Receipt object to automatically inform merchants, manufacturers, or credit

15 card companies not send the receipt information to third parties.

Referring to **Figure 6,** a schematic diagram illustrating a Smart Receipt clearing house service is depicted in accordance with the present invention. The

20 architecture illustrated in **Figure 6** is equivalent to that of **Figure 5.** However, **Figure 6** also includes a central receipt clearing house **606.** The clearing house **606** provides a central location for filing smart receipts from POS **601** and retrieving the receipts via Smart

25 Receipt object **605.**

The architecture in **Figure 5** requires the POS **501** and Smart Receipt object **505** to directly contact each separate receipt repository **502, 503,** and **504.** By contrast, the **Figure 6** architecture allows all receipt

30 storage and retrieval to occur at a central location, clearing house **606,** thus simplifying communications and record keeping.

The clearing house architecture also provides the customer with an extra degree of control and privacy. As stated above in reference to **Figure 5,** the customer owns the smart receipts and may set the Smart Receipt object

5 to automatically request that receipt information not be sent to third parties. In addition, if the customer does not want the smart receipts to be stored by the merchants or credit card companies at all, the customer can request that the receipts be sent from the POS to a clearing

10 house account. In this way the merchant, manufacturer, bank, or credit card company is not authorized to place the receipt in its own database. Instead, the customer maintains complete control. The request to send smart receipts to a clearing house may be entered by the

15 customer during a purchase or may be preset as a preference in the Smart Receipt object, which would automatically send the request every time a purchase is made.

Referring to **Figure 7,** a flowchart illustrating the

20 process of configuring a user profile for the Smart Receipt service is depicted in accordance with the present invention. The customer begins by starting the registration process on the Smart Receipt service web site (step **701**). The customer downloads a Smart Receipt

25 application (step **702**) and configures his or her user profile and preferences (step **703**). The customer profile contains personal identification information such as name and password. In addition, credit card numbers, purchase classifications (e.g. business, personal, educational),

30 information related to tax deductions, and other personal/financial information might be included in the customer profile. The customer profile might also

include which Personal Financial Manager (PFM) is used.
Examples of commonly used PFMs are Quicken and Money.
The Smart Receipt application can use the PFM on a client
machine to provide the user with a local up-to-date

5   account of previous purchases and receipts.

The customer then sends the configuration profile
back to the Smart Receipt service provider (step **704**).
The customer finishes the registration process and
receives confirmation from the service provider (step

10   **705**). The customer then receives a Smart Receipt card or
Credit/ATM card which is enabled for Smart Receipt
processing (step **706**). The Smart Receipt card is used
for cash or check purchases. Whereas a credit or ATM
card can be electronically enabled to provide a customer

15   profile during a purchase (i.e. when the card is swiped
through a reader), paper cash and checks do not have this
capability. Therefore, a Smart Receipt card may be used
(swiped) during a cash/check purchase in order to provide
the customer profile, which the Smart Receipt service

20   requires in order send the smart receipt to the proper
account and cash receipt server, such as servers **504** and
604.

Referring now to **Figure 8,** a flowchart illustrating
the Smart Receipt purchasing process is depicted in

25   accordance with the present invention. When using the
Smart Receipt service, the customer makes a purchase with
a Smart Receipt-enabled credit card or a Smart Receipt
card for cash/check purchases (step **801**). The when the
card is swiped by the merchant, the POS system reads the

30   user profile from the card or retrieves the profile based
on a code stored on the card (step **802**). As an
alternative to reading the profile off a card, the POS

system may provide a menu for the customer to provide the
necessary information. The Smart Receipt system will
route the smart receipt to the proper destination, after
determining the method of payment and user profile (step

5   **803**). If the customer uses cash or check, the smart
receipt is sent to the Cash Receipt Services server (step
804). Optionally, the receipt information may also be
sent to a manufacturer server, as explained above. If
the customer uses a credit card, the smart receipt is

10   sent to the credit card company (and/or manufacturer)
(step **805**). Steps **803, 804,** and **805** assume that the
Smart Receipt service is using the architecture depicted
in **Figure 5.** If the **Figure 6** architecture is used, all
receipt information would be sent directly to a clearing

15   house server.

Referring now to **Figure 9,** a flowchart illustrating
the Smart Receipt search process is depicted in
accordance with the present invention. At a later time,
the customer may need to retrieve a smart receipt (step

20   **901**). For example, the customer may need the receipt for
warranty purposes or tax deductions. The customer enters
search criteria such as item type, brand, alternative or
substitute items, approximate date of purchase, and
method of payment (step **902**). In addition to search

25   criteria, the customer can also indicate whether
additional information about the item is desired.
Examples of additional information include warranty,
identical items available for exchange, alternative items
available for exchange, customer alerts on product

30   safety, and product updates.

The Smart Receipt object uses the search criteria to
locate the desired receipt (and any additional product

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information) (step **903**). The search criteria will also
allow the Smart Receipt object to determine from which
location to retrieve the receipt (i.e. cash server or
credit card company). Of course, if a clearing house is

5   used, receipts can be retrieved directly from the
clearing house. The Smart Receipt object then downloads
the information to the desired client machine, based on
preferences in the customer profile (step **904**). Examples
of client machines to which smart receipts may be

10 downloaded include PCs, laptop computers, PDAs, mobile
phones, and palm computers.

The customer can request multiple receipts, based
upon search criteria or the category code provided at
purchase. For example, for tax purposes, customers may

15 need receipts for all purchases related to business. The
customer specifies "tax deduction" in the search criteria
or customer profile. The Smart Receipt object will then
search for the "tax year" desired, and can download the
necessary information to a PFM such as Quicken or Money,

20 or to a tax application like TurboTax.

The Smart Receipt object can be used for a variety
of functions in addition to retrieving smart receipts
from previous purchases. As stated above, the Smart
Receipt object can be preset to automatically request

25 that receipts be sent to a clearing house account, to
help ensure privacy. As another example, the Smart
Receipt object may also be set to automatically register
for warranties using information from the customer
profile, thereby saving the customer from having to

30 register every time a purchase is made. As stated above,

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certain receipts may be marked for later tax deductions. This preference may be preset in the Smart Receipt object for specified categories of purchases.

Customers may use the Smart Receipt object to
5   automate their bills. This application may be particularly useful for small businesses which need to maintain extensive records for tax reasons and cost comparisons, but cannot afford expensive accounting services. For example, separate Smart Receipt accounts
10 may be maintained for all employees in the company. The employees may use their accounts to access and organize receipts for expense reports. In turn, company managers may also use these accounts to compare and evaluate the expenses of employees, or for the firm in general.
15   The Smart Receipt object may also be used for more personal applications. Individuals may use the Smart Receipt object to gather receipts for personal tax deductions, or to compare similar purchases made from different merchants. As another example, after
20 completing a purchase, but before leaving the store, the customer may retrieve a receipt using his or her PDA and compare the items on the receipt with items on a shopping list. In this way, the customer could perform a last minute check to make sure nothing was forgotten from the
25 list.

To prevent receipt databases from becoming too cluttered, customers can delete unnecessary receipts using the Smart Receipt object. The customer may request the Smart Receipt object to delete specified receipts or
30 set the Smart Receipt object to automatically delete receipts, based on criteria in the customer profile. For

example, the Smart Receipt object might delete a receipt after the warranty for that item has expired.

It is important to note that while the present invention has been described in the context of a fully
5 functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that the present invention
10 applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media, such as a floppy disk, a hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and
15 transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions. The computer readable media may take the form of coded
20 formats that are decoded for actual use in a particular data processing system.

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the
25 invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of
30 ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.